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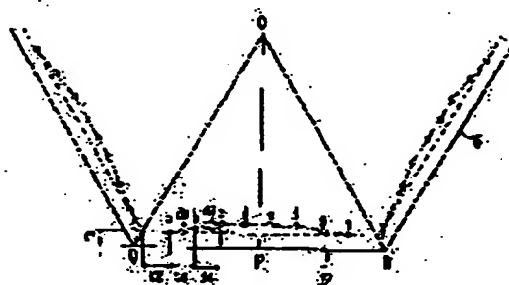
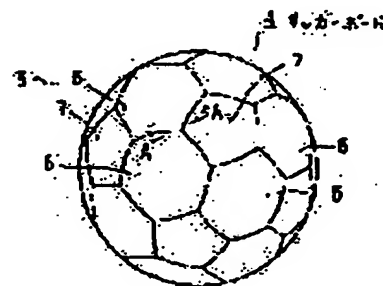
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 NAGAO YUKINORI  
 KURIKI HIDESUKE  
 YAMAGUCHI ATSUSHI

#### (54) BALL FOR BALL GAME

##### (57)Abstract:

**PROBLEM TO BE SOLVED:** To obtain the soft touch while keeping the capacity as a ball, in a ball for a ball game having a skin layer formed by sewing the peripheries of leather panels, by curving the sewing lines formed along the peripheries of the leather panels toward the centers of the leather panels.

**SOLUTION:** The skin layer 5 of a soccer ball 4 consists of, for example, 20 equilateral hexagonal leather panels 6 and 12 equilateral pentagonal panels 7 and the peripheries of the leather panels-6, 7 are folded inside to be sewn by yarn to be formed into a spherical shape as a whole. Packing layers composed of cloth are bonded to the rear surfaces of the leather panels 6, 7 and compressed air is sealed in the hollow spherical rubber tube housed in the skin layer 5. When the leather panels 6, 7 are sewn by yarn, the corner parts where the sides of three leather panels 6, 6, 7 cross each other are largely depressed toward the center of the ball and deep cavities are formed at a region where three grooves formed to stitches cross each other.



#### LEGAL STATUS

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] this invention relates to balls for ball games, such as a football, especially the ball for ball games of sewing structure.

[0002]

[Description of the Prior Art] Balls for ball games, such as a football, are sewn from the difference in the structure, are stuck with a ball, and can be divided roughly into two kinds of balls. A sewing ball means the ball of the structure where two or more leather panels which form an epidermis layer joined by stitching, and they were carried out, it sticks, and a ball means the ball of the structure where two or more leather panels were stuck on the ball base. Usually, since the feel was soft, when it excelled in the ball control nature at the time of football etc., and flight distance in the ease of holding since the slot on the portion was deep to the seam, when the direction of a sewing ball has in grip nature, i.e., a hand, and a ball collides with the body, there is an advantage that the shock at the time of football is suppressed. So, recently, it sews and the direction of a ball is coming to use it widely. in addition, the leather panel which constitutes an epidermis layer -- a natural leather and artificial leather and other leather -- a panel [ like ] is said

[0003] The football of sewing structure is indicated by JP,5-10833,Y. Drawing 4 shows one right 6 square-shape leather panel 1 which constitutes the epidermis layer of the conventional example football, separates a fixed interval around it, and is the diameter of 1.0-2.0mm. Two or more stomata 2 and 2 for a suture and ... are formed. These stomata 2 and 2 and the leather panel 1 which ... lets thread pass and adjoins it join by stitching, and is carried out, it is formed in a globular form as a whole, and a globular form hollow object rubber tube is contained by the interior. Usually, stomata 2 and 2 and the suture 3 which connects ... are formed in the straight line of right 6 square shapes parallel to one side in many cases, as shown in an above-shown official report. Moreover, the structure of incurvating this suture 3 on the outside of the leather panel 1 is also known (JP,51-45461,U).

[0004]

[Problem(s) to be Solved by the Invention] Generally it sews and the softness of a ball performance and tactile feeling is an opposite property in a ball. That is, if it is going to improve ball performances, such as grip nature, control nature, and flight distance, in the structure of an indication in an above-shown official report (JP,5-10833,Y), it is necessary to make deep the slot formed in the seam of a leather panel to enlarge irregularity on the front face of a ball. Although how to use a stiff leather panel and to use thick sewing thread can be considered in order to realize this, when are carried out like this, and tactile feeling of a ball becomes hard and hits the body, there is a problem that a shock is great and it is painful. If a soft leather panel is used on the other hand in order for there to be soft tactile feeling, a slot will become shallow and the problem that a ball performance falls will be produced.

[0005] Moreover, if a suture is incurvated on the outside of a panel like an indication to an official report (JP,51-45461,U), an epidermis layer will approach a globular form more, surface irregularity will become small, and, so, a ball performance will fall further.

[0006] It was made in order that this invention might solve such a problem, and tactile feeling also realizes the soft ball for ball games, maintaining the performance as a ball.

[0007]

[Means for Solving the Problem] The suture formed around the above-mentioned leather panel along this circumference is made to come to curve to this invention in the direction of a center of the above-mentioned leather panel in the ball for ball games which comes to have the epidermis layer which sewed up the circumference of the tube made of rubber of the globular form hollow object with which a compressed air is enclosed, and two or more polygon leather panels, and was formed, and which covers the above-mentioned tube.

[0008] Moreover, in this invention, the curvature of the above-mentioned suture can be set up almost equally to the curvature of the front face of the ball for ball games.

[0009] Moreover, in this invention, 20 6 square-shape leather panels and 12 5 square-shape leather panels can be sewn up, and the above-mentioned epidermis layer can be considered as the composition of a football.

[0010]

[Function] Although a globular form is maintained as the whole when a leather panel is sewn up since the suture of a leather

panel is curving in the direction of a center of a panel, the hollow inside the slot in a polygon corner becomes large, therefore the irregularity of an epidermis layer becomes large.

[0011]

[Example] drawing 1 and drawing 2 -- setting -- 4 -- a football -- being shown -- the epidermis layer 5 -- 20 right 6 square-shape leather panels 6 and 6 .... and 12 right 5 square-shape leather panels 7 and 7 -- it consists of .... It is bent inside, and the circumference joins by stitching with thread 8, and is carried out, and the leather panels 6 and 7 are constituted by the globular form as a whole. 9 is the slot formed in the seam of the leather panels 6 and 7. The backing layer 10 which consists of cloth has pasted the rear face of the leather panels 6 and 7. The compressed air is enclosed by the tube made of rubber of a hollow globular form by which 11 was contained in the epidermis layer 5.

[0012] Drawing 3 shows 6 square-shape leather panel 6, and, in the case of a No. 5 size football (diameter of about 22cm); is length  $QR=48.4\text{mm}$  of one side. A panel is used, and it sews to the 2.5mm inside (d1), and is the side ST (a straight line with a length of 44.4mm and a drawing destructive line show). It is prepared. S And T Straight lines OQ and OR It is the upper point. a, b, c, d, e, f, g, and h They are eight stomata for a suture with a diameter of about 1mm formed in the direction of a center of a panel 6 by curving from the sewing side ST. These stomata a, b, c, d, e, f, g, and h Connected curve (an alternate long and short dash line shows) It is called a suture 12. It is Stoma a here. It sets on the sewing side ST and is Point S. It is located in a view (d2) Nakamigi side 4.7mm. Moreover, stomata b, c, and d It is the panel center O from the sewing side ST. It is located in a side. Stomata a, b, c, d, e, f, g, and h Center O of a panel 6 Neighboring center P It is arranged by the object to the straight line OP to connect. Namely, stoma a Stoma h and stoma b Stoma g and stomata c and d Stomata e and f It is in an object position. They are Stomata c, d, e, and f here. It is arranged on the same straight line. Stomata d and e Stomata c and f If it receives and is made to arrange to the panel center O side, when it sutures with thread 8 ( drawing 2 ), they are Stomata d and e. It is because there is a possibility that the seam of a between may open. However, if it takes into consideration in etc. especially on a leather panel using a soft thing, they will be Stomata d and e. Stomata c and f It receives and is the panel center O. It is possible to also make it arrange to a side. the above-mentioned example -- setting -- stomata a, b, and c the interval (d3) of the straight-line OP direction -- each 0.5 mm -- again -- stomata a, b, c, d, e, f, g, and h the interval (d4) of a between -- 5mm \*\* -- it can carry out The same stoma is prepared also in 5 square-shape leather panel 7. if it is made this structure -- the leather panels 6 and 7 -- when .... joins by stitching with thread 8 and is carried out, the corner which the side of three leather panels 6, 6, and 7 crosses will become depressed greatly in the direction of a ball center

[0013] The suture 12 constitutes a trapezoid raised bottom and the inclination side on either side from an above-mentioned example. A suture 12 shall be good also as a circular curve besides the above-mentioned trapezoid curve, and these curves shall be contained in the definition of a curve. On the basis of the curvature of football 4 front face, the curvature of a suture 12 is equal to this, or is set as the value near this. It is because improvement in a ball performance will hardly be found if it is made a value smaller than this, but faults, such as irregular bound, will arise if too conversely larger than this value, or it becomes easy to open a seam. Moreover, in a No. 5 size football, although eight per one side of leather panels are common as for the number of stomata, it has some which were made into nine pieces. Moreover, also in the ball of No. 4 size, they are about 8-9 pieces. In addition, the hole for a suture can be replaced with the circular stoma like the above, and a slit with a length of 2-3mm can also be used for it.

[0014] Clay is put in the slot 9 of the seam portion of the football 4 of the above-mentioned structure, and it is the center O of the leather panels 6 and 7. When the true sphere was formed so that it might appear in a front face, and the capacity of the slot 9 whole was measured from the amount of this clay, it was 3 about 100cm. the place which measured the capacity of a slot 9 conventionally about the ball (what used the same same size and leather panel and made the suture the straight line) of structure for comparison -- about 60 -- cm<sup>3</sup> it was . Moreover, center O of panels 6 and 7 The difference of the periphery of the above-mentioned true sphere along which it passes, and the periphery passing through the bottom of a slot 9 was about 9 mm in 14mm and the conventional example in the above-mentioned example. An example ball is understood from this that slot 9 portion is more greatly [ than the conventional example ball ] deep.

[0015] Next, as an experiment about tactile feeling at the time of the collision of an example ball and the conventional example ball, it is fixed height (1m) about a ball. Shell natural fall was carried out and the impact resistance value was measured. the result -- an example ball -- impact-resistance-value 60.8kgf and the conventional example ball -- impact-resistance-value 65.4kgf it is -- it turns out that an impact resistance value is [ the example ball ] smaller, and tactile feeling at the time of the collision to a human body is soft It was also checked that the difference of the above-mentioned impact resistance value is a difference which can be taken in with people's feeling.

[0016] In the above-mentioned example, although explained per [ which makes basic structure semi- positive 32 face piece which consists of 20 right 6 square shapes and 12 right 5 square shapes ] football, the regular polyhedron or quasi-regular polyhedra of semi- positive 32 face piece and others which consists of combination of right 5 square shapes and right 3 square shapes is also applicable to the football made into basic structure. Moreover, it is effective even if not only a football but an epidermis layer uses it for the sewing ball, for example, the handball, which consists of polygon leather panels.

[0017]

[Effect of the Invention] According to the ball for ball games concerning this invention, in the part which three slots formed in a seam cross, a deep hollow is formed by incurvating the suture prepared around the leather panel in the direction of a panel center. It was checked that the irregularity on the front face of a ball becomes large from this, and grip nature and control nature are improved, and flight distance is also extended. Moreover, the above-mentioned hollow is uniformly arranged with regularity on a ball front face, and since the depth is set as the grade which does not affect movement of a ball,

there is no possibility of saying that a ball carries out irregular bound or the irregular way of flying is adopted.  
[0018] Moreover, since a trench is maintained according to this invention even if it can suppress the shock at the time of the collision to a human body and uses a soft leather panel, since the irregularity of a surface layer is large, it becomes usable [ the soft leather which was not able to be used by the reason for spoiling ball performances, such as grip nature, conventionally ], and the ball for ball games which bears the merit of tactile feeling and a safety pan at advanced game technology can realize.

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**TECHNICAL FIELD**

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[Industrial Application] this invention relates to balls for ball games, such as a football, especially the ball for ball games of sewing structure.

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#### PRIOR ART

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[0003] The football of sewing structure is indicated by JP,5-10833,Y. Drawing 4 shows one right 6 square-shape leather panel 1 which constitutes the epidermis layer of the conventional example football, separates a fixed interval around it, and is the diameter of 1.0-2.0mm. Two or more stomata 2 and 2 for a suture and ... are formed. These stomata 2 and 2 and the leather panel 1 which ... lets thread pass and adjoins it join by stitching, and is carried out, it is formed in a globular form as a whole, and a globular form hollow object rubber tube is contained by the interior. Usually, stomata 2 and 2 and the suture 3 which connects ... are formed in the straight line of right 6 square shapes parallel to one side in many cases, as shown in an above-shown official report. Moreover, the structure of incurvating this suture 3 on the outside of the leather panel 1 is also known (JP,51-45461,U).

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## EFFECT OF THE INVENTION

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[Effect of the Invention] According to the ball for ball games concerning this invention, in the part which three slots formed in a seam cross, a deep hollow is formed by incurvating the suture prepared around the leather panel in the direction of a panel center. It was checked that the irregularity on the front face of a ball becomes large from this, and grip nature and control nature are improved, and flight distance is also extended. Moreover, the above-mentioned hollow is uniformly arranged with regularity on a ball front face, and since the depth is set as the grade which does not affect movement of a ball, there is no possibility of saying that a ball carries out irregular bound or the irregular way of flying is adopted.

[0018] Moreover, since a trench is maintained according to this invention even if it can suppress the shock at the time of the collision to a human body and uses a soft leather panel, since the irregularity of a surface layer is large, it becomes usable [ the soft leather which was not able to be used by the reason for spoiling ball performances, such as grip nature, conventionally ], and the ball for ball games which bears the merit of tactile feeling and a safety pan at advanced game technology can realize.

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#### TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Generally it sews and the softness of a ball performance and tactile feeling is an opposite property in a ball. That is, if it is going to improve ball performances, such as grip nature, control nature, and flight distance, in the structure of an indication in an above-shown official report (JP,5-10833,Y), it is necessary to make deep the slot formed in the seam of a leather panel to enlarge irregularity on the front face of a ball. Although how to use a stiff leather panel and to use thick sewing thread can be considered in order to realize this, when are carried out like this, and tactile feeling of a ball becomes hard and hits the body, there is a problem that a shock is great and it is painful. If a soft leather panel is used on the other hand in order for there to be soft tactile feeling, a slot will become shallow and the problem that a ball performance falls will be produced.

{0005} Moreover, if a suture is incurvated on the outside of a panel like an indication to an official report (JP,51-45461,U), an epidermis layer will approach a globular form more, surface irregularity will become small, and, so, a ball performance will fall further.

[0006] It was made in order that this invention might solve such a problem, and tactile feeling also realizes the soft ball for ball games, maintaining the performance as a ball.

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OPERATION

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[Function] Although a globular form is maintained as the whole when a leather panel is sewn up since the suture of a leather panel is curving in the direction of a center of a panel, the hollow inside the slot in a polygon corner becomes large, therefore the irregularity of an epidermis layer becomes large.

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## EXAMPLE

[Example] drawing 1 and drawing 2 -- setting -- 4 -- a football -- being shown -- the epidermis layer 5 -- 20 right 6 square-shape leather panels 6 and 6 .... and 12 right 5 square-shape leather panels 7 and 7 -- it consists of .... It is bent inside, and the circumference joins by stitching with thread 8, and is carried out, and the leather panels 6 and 7 are constituted by the globular form as a whole. 9 is the slot formed in the seam of the leather panels 6 and 7. The backing layer 10 which consists of cloth has pasted the rear face of the leather panels 6 and 7. The compressed air is enclosed by the tube made of rubber of a hollow globular form by which 11 was contained in the epidermis layer 5.

[0012] Drawing 3 shows 6 square-shape leather panel 6, and, in the case of a No. 5 size football (diameter of about 22cm), is length QR=48.4mm of one side. A panel is used, and it sews to the 2.5mm inside (d1), and is the side ST (a straight line with a length of 44.4mm and a drawing destructive line show). It is prepared. S And T Straight lines OQ and OR It is the upper point. a, b, c, d, e, f, g, and h They are eight stomata for a suture with a diameter of about 1mm formed in the direction of a center of a panel 6 by curving from the sewing side ST. These stomata a, b, c, d, e, f, g, and h Connected curve (an alternate long and short dash line shows) It is called a suture 12. It is Stoma a here. It sets on the sewing side ST and is Point S. It is located in a view (d2) Nakamigi side 4.7mm. Moreover, stomata b, c, and d It is the panel center O from the sewing side ST. It is located in a side. Stomata a, b, c, d, e, f, g, and h Center O of a panel 6 Neighboring center P It is arranged by the object to the straight line OP to connect. Namely, stoma a Stoma h and stoma b Stoma g and stomata c and d Stomata e and f It is in an object position. They are Stomata c, d, e, and f here. It is arranged on the same straight line. Stomata d and e Stomata c and f If it receives and is made to arrange to the panel center O side, when it sutures with thread 8 ( drawing 2 ), they are Stomata d and e. It is because there is a possibility that the seam of a between may open. However, if it takes into consideration in etc. especially on a leather panel using a soft thing, they will be Stomata d and e. Stomata c and f It receives and is the panel center O. It is possible to also make it arrange to a side. the above-mentioned example -- setting -- stomata a, b, and c the interval (d3) of the straight-line OP direction -- each 0.5 mm -- again -- stomata a, b, c, d, e, f, g, and h the interval (d4) of a between -- 5mm \*\* -- it can carry out The same stoma is prepared also in 5 square-shape leather panel 7. if it is made this structure -- the leather panels 6 and 7 -- when .... joins by stitching with thread 8 and is carried out, the corner which the side of three leather panels 6, 6, and 7 crosses will become depressed greatly in the direction of a ball center

[0013] The suture 12 constitutes a trapezoid raised bottom and the inclination side on either side from an above-mentioned example. A suture 12 shall be good also as a circular curve besides the above-mentioned trapezoid curve, and these curves shall be contained in the definition of a curve. On the basis of the curvature of football 4 front face, the curvature of a suture 12 is equal to this, or is set as the value near this. It is because improvement in a ball performance will hardly be found if it is made a value smaller than this, but faults, such as irregular bound, will arise if too conversely larger than this value, or it becomes easy to open a seam. Moreover, in a No. 5 size football, although eight per one side of leather panels are common as for the number of stomata, it has some which were made into nine pieces. Moreover, also in the ball of No. 4 size, they are about 8-9 pieces. In addition, the hole for a suture can be replaced with the circular stoma like the above, and a slit with a length of 2-3mm can also be used for it.

[0014] Clay is put in the slot 9 of the seam portion of the football 4 of the above-mentioned structure. and it is the center O of the leather panels 6 and 7. When the true sphere was formed so that it might appear in a front face, and the capacity of the slot 9 whole was measured from the amount of this clay, it was 3 about 100cm. the place which measured the capacity of a slot 9 conventionally about the ball (what used the same same size and leather panel and made the suture the straight line) of structure for comparison -- about 60 -- cm3 it was . Moreover, center O of panels 6 and 7 The difference of the periphery of the above-mentioned true sphere along which it passes, and the periphery passing through the bottom of a slot 9 was about 9 mm in 14mm and the conventional example in the above-mentioned example. An example ball is understood from this that slot 9 portion is more greatly [ than the conventional example ball ] deep.

[0015] Next, as an experiment about tactile feeling at the time of the collision of an example ball and the conventional example ball, it is fixed height (1m) about a ball. Shell natural fall was carried out and the impact resistance value was measured. the result -- an example ball -- impact-resistance-value 60.8kgf and the conventional example ball -- impact-resistance-value 65.4kgf it is -- it turns out that an impact resistance value is [ the example ball ] smaller, and tactile feeling at the time of the collision to a human body is soft It was also checked that the difference of the above-mentioned impact resistance value is a difference which can be taken in with people's feeling.

[0016] In the above-mentioned example, although explained per [ which makes basic structure semi- positive 32 face piece

which consists of 20 right 6 square shapes and 12 right 5 square shapes ] football, the regular polyhedron or quasi-regular polyhedra of semi-positive 32 face piece and others which consists of combination of right 5 square shapes and right 3 square shapes is also applicable to the football made into basic structure. Moreover, it is effective even if not only a football but an epidermis layer uses it for the sewing ball, for example, the handball, which consists of polygon leather panels.

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## DESCRIPTION OF DRAWINGS

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### [Brief Description of the Drawings]

[Drawing 1] It is the front view of the ball for ball games concerning this invention example.

[Drawing 2] It is the A-A line cross section of drawing 1.

[Drawing 3] It is the plan showing 6 square-shape leather panel.

[Drawing 4] It is the plan showing the conventional example leather panel.

### [Description of Notations]

1, 6, 7 ..... Leather panel

2 a, b, c, d, e, f, g, h ..... Stoma

3 12 ..... Suture

4 ..... Football

5 ..... Epidermis layer

8 ..... Thread

9 ..... Slot

10 ..... Backing layer

11 ..... Tube

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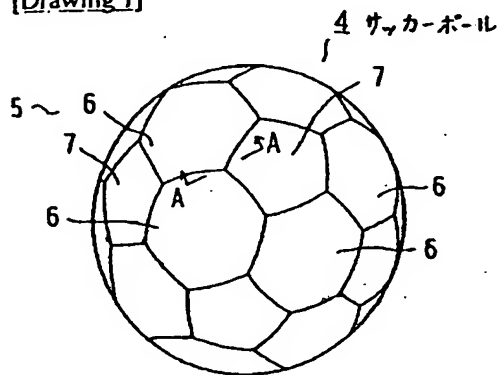
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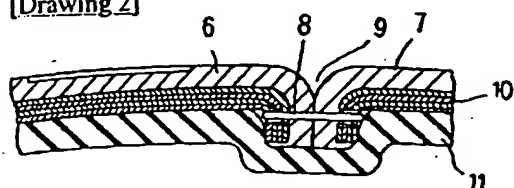
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## DRAWINGS

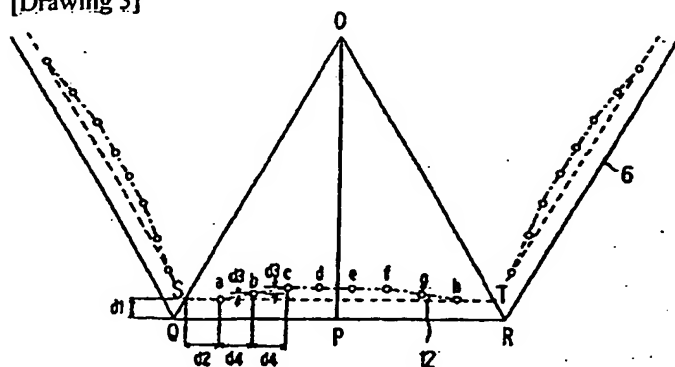
[Drawing 1]



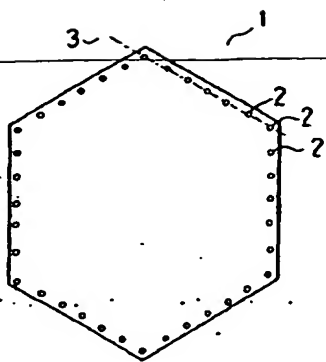
[Drawing 2]



[Drawing 3]



[Drawing 4]



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## CLAIMS

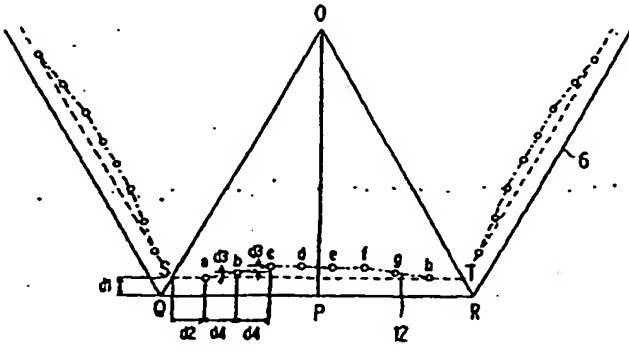
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[Claim(s)]

[Claim 1] The ball for ball games with which the suture formed around the above-mentioned leather panel along this circumference is made to curve in the direction of a center of the above-mentioned leather panel, and is characterized by the bird clapper in the ball for ball games which comes to have the epidermis layer which sewed up the circumference of the tube made of rubber of the globular form hollow object with which a compressed air is enclosed, and two or more polygon leather panels, and was formed, and which covers the above-mentioned tube. [Claim 2] The ball for ball games according to claim 1 with which the curvature of the above-mentioned suture is set up almost equally to the curvature of the front face of the ball for ball games, and is characterized by the bird clapper. [Claim 3] The ball for ball games according to claim 1 or 2 characterized by the above-mentioned epidermis layer being the football which comes to \*\*\*\*\* 20 6 square-shape leather panels and 12 5 square-shape leather panels.

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[Translation done.]



[Translation done.]